

REMARKS

In the Office Action¹, the Examiner rejected claims 2, 4-9, 13-15, and 21 under 35 U.S.C. § 103(a) as being unpatentable over Mashino et al. (U.S. Publication No. 2002/0190375 A1, "Mashino") in view of Mikawa et al. (U.S. Publication No. 2002/0115226 A1, "Mikawa"); rejected claims 10-12 under 35 U.S.C. § 103(a) as being unpatentable over Mashino, Mikawa, and Mayashita et al. (U.S. Publication No. 2001/0045605 A1, "Mayashita"); and rejected claims 16-20 under 35 U.S.C. § 103(a) as being unpatentable over Mashino, Mikawa, and Sakao (U.S. Patent No. 6,166,425).

Applicant has amended claims 2, 5-12, and 16-21; cancelled claim 4; and added new claims 21-24 which depend from corresponding independent claims 2, 7, and 9. Claims 1 and 3 are cancelled, and, thus claims 2 and 4-24 are remain under examination. Claims 2, 7, and 9 have been amended to improve clarity with respect to the claimed invention. Dependent claims 4-6, 8, 10, 11, 12, and 16-21 have been amended to reflect the changes to their corresponding independent claims 2, 7, or 9.

Applicant respectfully traverses the rejection of independent claim 2 under 35 U.S.C. § 103(a) as being unpatentable over Mashino in view Mikawa because no *prima facie* case of obviousness has been established.

To establish a *prima facie* case of obviousness, three basic criteria must be satisfied. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference or to combine references. Second, there must be a reasonable

¹ The Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statement is identified herein, Applicant declines to automatically subscribe to any statement or characterization in the Office Action.

expectation of success. Third, the prior art reference (or references when combined) must teach or suggest all of the claim elements. See M.P.E.P. § 2143. Moreover, the requisite teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure. See *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). See M.P.E.P. § 706.02(j).

Claim 2 recites a semiconductor device including:

a plurality of diffusion layer patterns formed on the semiconductor substrate;

an insulation film formed between the plurality of diffusion layer patterns on the semiconductor substrate; and

a through plug formed to be partly surrounded by the diffusion layer patterns without being in contact with the insulation film and to pass through the diffusion layer patterns and the semiconductor substrate

(emphasis added). Mashino and Mikawa, either alone or in combination, fail to teach or suggest at least the "through plug" recited in claim 2.

At page 2 of the Office Action, the Examiner states Fig. 10 of Mashino discloses the claimed "through plug." This is incorrect. Although Mashino teaches a through hole 212 filled with conductor 217 (paragraph [0146]), the reference fails to teach "a plurality of diffusion layer patterns," and therefore cannot teach or suggest the claimed "through plug formed . . . to pass through the plurality of diffusion layer patterns" (emphasis added), as recited in claim 2. The Examiner concedes this at page 3 of the Office Action ("Mashino does not teach . . . a plurality of diffusion layer patterns"). In addition, the Examiner appears to further concede that Mikawa also fails to teach or suggest the claimed "through plug," recited in claim 2, given his reliance on Mashino.

Moreover, Applicant respectfully submits that neither Mashino nor Mikawa contain a suggestion or motivation to combine the references in the proposed manner. In the Office Action, the Examiner has not provided any motivation or suggestion from either Mashino and Mikawa to combine the references in the manner suggested, except to make broad and conclusory statements that one of ordinary skill in the art would combine elements from the cited prior art to “realize a ferroelectric memory device.” Office Action at page 3.

Applicant respectfully reminds the Examiner that:

[t]he initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

M.P.E.P. § 706.02(j), italics added.

M.P.E.P. § 2143.01 further instructs that “[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination” (emphasis added).

Mashino and Mikawa are specifically directed towards the solution of different problems associated with semiconductor fabrication. Mashino discloses a method of producing “electrical connection between an electrode pad and interconnection pattern without separate provision of a via hole use electrode pad in addition to the existing main electrode pad.” Para. [0018], emphasis added. In contrast, Mikawa teaches a formation method to reduce “variations in the thickness of the interlayer insulating film”

and to limit the “erosion phenomenon of the contact plugs” which induce variations in the thickness of the capacitor insulating film. Para. [0011], emphasis added. Applicant respectfully submits that given the stated purpose of each of the references, there is no motivation or suggestion to combine the references disclosed by either reference in the proposed manner, nor would it have been obvious to one of ordinary skill in the art to combine various elements of Mashino and Mikawa to form the “semiconductor device,” recited in claim 2.

Accordingly, no *prima facie* case of obviousness is established based on Mashino and Mikawa with respect to claim 2 because the cited references, either alone or in combination, fail to teach or suggest the claimed “through plug,” and because neither reference discloses a teaching or suggestion to provide a motivation to combine the references. Moreover, claims 7 and 9 recite limitations similar to those of claim 2, and are therefore allowable over Mashino and Mikawa for reasons similar to those discussed above. In addition, claims 4-6, 8, 13-15, and 21 depend from corresponding independent claims 2, 7, or 9, and incorporate each and every element recited therein. Accordingly, dependent claims 4-6, 8, 13-15, and 21 are also allowable over Mashino and Mikawa for the same reasons as their corresponding independent claim. Applicant therefore respectfully requests that the Examiner reconsider and withdraw the rejections of claims 2, 4-9, 13-15, and 21 under 35 U.S.C. § 103(a).

Applicant respectfully traverses the rejection of claims 10-12 under 35 U.S.C. § 103(a) as being unpatentable over Mashino, Mikawa, and Mayashita. Claims 10-12 depend from independent claims 7, 2, and 9, respectively, and thus incorporate each and every element recited in each of their respective independent claims. As set forth

above, claims 7, 2, and 9, recite elements not taught by Mashino and Mikawa. Mayashita discloses a “semiconductor device of a MIS” structure (paragraph [0001]), but also fails to teach or suggest the claimed “through plug” recited in claims 7, 2, and 9, and required by claims 10-12. Applicant respectfully requests the Examiner reconsider and allow claims 10-12.

Applicant respectfully traverses the rejection of claims 16-20 under 35 U.S.C. § 103(a) as being unpatentable over Mashino, Mikawa, and Sakao. Claims 16-20 depend from corresponding independent claims 2, 7, or 9. As set forth above, claims 2, 7, and 9 recite elements not taught by Mashino and Mikawa. Sakao also fails to teach these elements. Sakao is drawn to a “semiconductor device including a MOS transistor and a resistance element with a large resistivity.” However, Sakao also fails to teach or suggest the claimed “through plug” recited in independent claims 2, 7, and 9, and required by their corresponding dependent claims 16-20. Accordingly, no *prima facie* case of obviousness is established with respect to claims 16-20. Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claims 16-20.

New claims 21-24 respectively depend from independent claims 2, 7, and 9, and are therefore allowable over Mashino, Mikawa, Mayashita, and Sakao for the above discussed reasons. Applicant respectfully submits that claims 2 and 4-24 are in condition for immediate allowance.

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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